

FCC/ISED
RF
TEST REPORT

ISSUED BY
Shenzhen BALUN Technology Co., Ltd.



FOR
Smart Phone

ISSUED TO
Xplore Technologies Corp.

8601 Ranch Rd. 2222, Building 2, Austin, TX 78730 USA



Tested by:
Heng Aiping
(Engineer)

Date: Jun. 28, 2018

Approved by:
Wei Yanquan
(Chief Engineer)

Date: Jun. 25, 2018



Report No.: BL-EC1850443-501
EUT Name: Smart Phone
Model Name: M6
Brand Name: Xplore
Test Standard: 47 CFR Part 2 (10-1-17 Edition)
IC RSS-Gen Issue 4, March 2018
(Others refer to chapter 3.1)
FCC ID: Q2GIX006M1
ISED Number: 4596A-IX006M1
Test Conclusion: Pass
Test Date: May 29, 2018 ~ Jun. 01, 2018
Date of Issue: Jun. 05, 2018

NOTE: This test report of test results only related to testing samples, which can be duplicated completely for the legal use with the approval of the applicant; it shall not be reproduced except in full, without the written approval of Shenzhen BALUN Technology Co., Ltd. BALUN Laboratory. Any objections should be raised within thirty days from the date of issue. To validate the report, please contact us.

Revision History

<u>Version</u>	<u>Issue Date</u>	<u>Revisions Content</u>
<u>Rev. 01</u>	<u>Jun. 04, 2018</u>	<u>Initial Issue</u>

TABLE OF CONTENTS

1	ADMINISTRATIVE DATA (GENERAL INFORMATION)	4
1.1	Identification of the Testing Laboratory.....	4
1.2	Identification of the Responsible Testing Location	4
1.3	Laboratory Condition	4
1.4	Announce.....	5
2	PRODUCT INFORMATION	6
2.1	Applicant Information.....	6
2.2	Manufacturer Information	6
2.3	Factory Information	6
2.4	General Description for Equipment under Test (EUT)	6
2.5	Ancillary Equipment.....	7
2.6	Technical Information	8
3	SUMMARY OF TEST RESULTS	10
3.1	Test Standards.....	10
3.2	Test Verdict.....	11
4	GENERAL TEST CONFIGURATIONS	13
4.1	Test Environments	13
4.2	Test Equipment List.....	13
4.3	Test Configurations	15
4.4	Test Setup.....	22
5	TEST ITEMS	24
5.1	Transmitter Radiated Power (EIRP/ERP).....	24
5.2	Peak to Average Ratio	27
5.3	Occupied Bandwidth	29
5.4	Frequency Stability.....	31
5.5	Spurious Emission at Antenna Terminals	34

5.6	Band Edge	38
5.7	Field Strength of Spurious Radiation	41
5.8	Receiver Spurious Emissions	45
ANNEX A	TEST RESULTS	46
A.1	Transmitter Radiated Power (EIRP/ERP)	46
A.2	Peak to Average Ratio	46
A.3	Occupied Bandwidth	46
A.4	Frequency Stability	46
A.5	Spurious Emission at Antenna Terminals	46
A.6	Band Edge	46
A.7	Field Strength of Spurious Radiation	47
A.8	Receiver Spurious Emissions	59
ANNEX B	TEST SETUP PHOTOS	60
ANNEX C	EUT EXTERNAL PHOTOS	60
ANNEX D	EUT INTERNAL PHOTOS	60

1 ADMINISTRATIVE DATA (GENERAL INFORMATION)

1.1 Identification of the Testing Laboratory

Company Name	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Phone Number	+86 755 6685 0100

1.2 Identification of the Responsible Testing Location

Test Location	Shenzhen BALUN Technology Co., Ltd.
Address	Block B, 1st FL, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China.
Accreditation Certificate	The laboratory has been listed by Industry Canada to perform electromagnetic emission measurements. The recognition numbers of test site are 11524A-1. The laboratory is a testing organization accredited by FCC as an accredited testing laboratory. The designation number is CN1196. The laboratory is a testing organization accredited by American Association for Laboratory Accreditation(A2LA) according to ISO/IEC 17025. The accreditation certificate number is 4344.01. The laboratory is a testing organization accredited by China National Accreditation Service for Conformity Assessment (CNAS) according to ISO/IEC 17025. The accreditation certificate number is L6791.
Description	All measurement facilities used to collect the measurement data are located at Block B, FL 1, Baisha Science and Technology Park, Shahe Xi Road, Nanshan District, Shenzhen, Guangdong Province, P. R. China 518055

1.3 Laboratory Condition

Ambient Temperature	20 ℃ to 35 ℃
Ambient Relative Humidity	30 % to 60 %
Ambient Pressure	98 kPa to 102 kPa

1.4 Announce

- (1) The test report reference to the report template version v1.2.
- (2) The test report is invalid if not marked with the signatures of the persons responsible for preparing and approving the test report.
- (3) The test report is invalid if there is any evidence and/or falsification.
- (4) The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein.
- (5) This document may not be altered or revised in any way unless done so by BALUN and all revisions are duly noted in the revisions section.
- (6) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

2 PRODUCT INFORMATION

2.1 Applicant Information

Applicant	Xplore Technologies Corp.
Address	8601 Ranch Rd. 2222, Building 2, Austin, TX 78730 USA

2.2 Manufacturer Information

Manufacturer	Shenzhen UniStrong Science & Technology Co.,Ltd.
Address	B,4-4Factory, Zhengcheng Road, FuyongBaoan District, Shenzhen, China

2.3 Factory Information

Factory	N/A
Address	N/A

2.4 General Description for Equipment under Test (EUT)

EUT Name	Smart Phone
Model Name Under Test	M6
Series Model Name	N/A
Description of Model name differentiation	N/A
Hardware Version	M6_V104
Software Version	M6_V1.0
Dimensions (Approx.)	N/A
Weight (Approx.)	N/A

2.5 Ancillary Equipment

Ancillary Equipment 1	Battery	
	Brand Name	SJYEnergy
	Model No.	BA7800
	Serial No.	N/A
	Capacity	8000 mAh
	Rated Voltage	3.8 V
	Limit Charge Voltage	4.35 V
Ancillary Equipment 2 ^{Note}	Adapter	
	Brand Name	N/A
	Model No.	ASUC71w-050912300
	Serial No.	ASUC71z-050912300 (z= a, e, i, w)
	Rated Input	100-240 V~, 0.7 A, 50/60 Hz
	Rated Output	5 V~ 3 A or 9 V~ 2 A or 12 V~ 1.5 A
Ancillary Equipment 3	Barcode Scanner	
Ancillary Equipment 4	Wrist Belt	
Ancillary Equipment 5	USB Cable	
	Length (Approx.)	1.0 m
Note: All adapter are same with electrical parameters and internal circuit structure, but only differ in model name and plug type. Adapter ASUC71w-050912300 was tested in this report.		

2.6 Technical Information

All Network and Wireless connectivity for EUT	2G Network GSM/GPRS/EGPRS 850/900/1800/1900 MHz; 3G Network WCDMA/HSDPA/HSUPA Band 1/2/5/8; CDMA 1x Band Class 0; EVDO Rel. 0/Rev. A Band Class 0; 4G Network FDD LTE Band 1/2/3/4/5/7/8/17/20/28; TDD LTE Band 38/40/41; Bluetooth, WIFI, GPS, GLONASS, NFC, BDS
About the Product	The equipment is Smart Phone, intended for used with information technology equipment.
Note 1: The EUT is a Smart Phone, supporting dual SIM card slots under the same transceiver. Both SIM card slots support GSM, CDMA, WCDMA and LTE. And both SIM card slots share the same transceiver, so only SIM1 is tested in this report.	

The requirement for the following technical information of the EUT was tested in this report:

Operating Bands	GSM/GPRS/EGPRS 850/ 1900 MHz CDMA 1x Band Class 0 EVDO Rel. 0/Rev. A Band Class 0 WCDMA/HSDPA/HSUPA Band 2/5 FDD LTE Band 2/4/5/7/17 TDD LTE Band 41	
Modulation Type	GSM/GPRS	GMSK
	EGPRS	8PSK
	CDMA 1x	O-QPSK, H-PSK, QPSK
	EVDO	QPSK, 8PSK, 16-QAM
	WCDMA	QPSK
	HSDPA	QPSK
	/HSUPA	16QAM
	LTE	QPSK 16QAM
TX Frequency Range	GSM/GPRS/EGPRS 850: 824 - 849 MHz GSM/GPRS/EGPRS 1900: 1850 - 1910 MHz CDMA/EVDO BC0: 824.025 - 848.985 MHz WCDMA/HSDPA/HSUPA Band 2: 1850 -1910 MHz WCDMA/HSDPA/HSUPA Band 5: 824 - 849 MHz LTE FDD Band 2: 1850 - 1910 MHz LTE FDD Band 4: 1710 - 1755 MHz LTE FDD Band 5: 824 - 849 MHz LTE FDD Band 7: 2500 - 2570 MHz LTE FDD Band 17: 704 - 716 MHz LTE TDD Band 41: 2555 - 2655 MHz	
Rx Frequency Range	GSM/GPRS/EGPRS 850: 869 - 894 MHz	

	GSM/GPRS/EGPRS 1900: 1930 - 1990 MHz CDMA/EVDO BC0: 869.025 - 893.985 MHz WCDMA/HSDPA/HSUPA Band 2: 1930 - 1990 MHz WCDMA/HSDPA/HSUPA Band 5: 869 - 894 MHz LTE FDD Band 2: 1930 - 1990 MHz LTE FDD Band 4: 2110 - 2155 MHz LTE FDD Band 5: 869 - 894 MHz LTE FDD Band 7: 2620 - 2690 MHz LTE FDD Band 17: 734- 746 MHz LTE TDD Band 41: 2555 - 2655 MHz
Power Class	GSM/GPRS 850: 4 GSM/GPRS 1900: 1 EGPRS 850/1900: E2 CDMA/EVDO BC0: 3 WCDMA/HSDPA/HSUPA Band 2: 3 WCDMA/HSDPA/HSUPA Band 5: 3 LTE FDD Band 2: 3 LTE FDD Band 4: 3 LTE FDD Band 5: 3 LTE FDD Band 7: 3 LTE FDD Band 17: 3 LTE TDD Band 41: 3
Multislot Class	GPRS/EGPRS: 12
Antenna Type	PIFA Antenna
Antenna Gain	GSM/GPRS/EGPRS 850: 1.5 dBi GSM/GPRS/EGPRS 1900: 1.5 dBi CDMA/EVDO BC0: 1.5 dBi WCDMA/HSDPA/HSUPA Band 2: 1.5 dBi WCDMA/HSDPA/HSUPA Band 5: 1.5 dBi LTE FDD Band 2: 1.5 dBi LTE FDD Band 4: 1.5 dBi LTE FDD Band 5: 1.5 dBi LTE FDD Band 7: 1.5 dBi LTE FDD Band 17: 1.5 dBi LTE TDD Band 41: 1.5 dBi

Note 1: The EUT information are declared by manufacturer. For more detailed features description, please refer to the manufacturer's specifications or user's manual.

3 SUMMARY OF TEST RESULTS

3.1 Test Standards

No.	Identity	Document Title
1	47 CFR Part 2 (10-1-17 Edition)	Frequency Allocations and Radio Treaty Matters; General Rules and Regulations
2	47 CFR Part 22 Subpart H (10-1-17 Edition)	Cellular Radiotelephone Service
3	47 CFR Part 24 Subpart E (10-1-17 Edition)	Broadband PCS
4	47 CFR Part 27 (10-1-17 Edition)	Miscellaneous Wireless Communications Services
5	RSS-Gen Issue4 (March 2018)	General Requirements and Information for the Certification of Radio Apparatus
6	RSS-130 Issue1 (October 2013)	Mobile Broadband Services (MBS) Equipment Operating in the Frequency Bands 698-756 MHz and 777-787 MHz
7	RSS-132 Issue3 (January 2013)	Cellular Telephone Systems Operating in the Bands 824-849 MHz and 869-894 MHz
8	RSS-133 Issue6 (January 2013)	2 GHz Personal Communications Services
9	RSS-139 Issue3 (July 2015)	Advanced Wireless Services (AWS) Equipment Operating in the Bands 1710-1780 MHz and 2110-2180 MHz
10	RSS-199 Issue3 (December 2016)	Broadband Radio Service (BRS) Equipment Operating in the Band 2500-2690 MHz
11	ANSI/TIA-603-E-2016	Land Mobile FM or PM Communications Equipment Measurement and Performance Standards
12	KDB 971168 D01 v03r01	Measurement Guidance for Certification of Licensed Digital Transmitters

3.2 Test Verdict

No.	Description	FCC Part No.	ISED Part No.	Test Result	Verdict
1	Conducted RF Output Power	2.1046	RSS-Gen 6.12 RSS-130 4.4 RSS-132 5.4 RSS-133 6.4 RSS-139 6.5 RSS-199 4.4	Reporting only (ANNEX A.1)	Pass
2	Effective (Isotropic) Radiated Power	2.1046 22.913 24.232 27.50	RSS-Gen 6.12 RSS-130 4.4 RSS-132 5.4 RSS-133 6.4 RSS-139 6.5 RSS-199 4.4	ANNEX A.1	Pass
3	Peak to Average Ratio	2.1046 24.232(d) 27.50(d)	RSS-130 4.4 RSS-132 5.4 RSS-133 6.4 RSS-139 6.5 RSS-199 4.4	ANNEX A.2	Pass
4	Occupied Bandwidth	2.1049 22.917 24.238 27.53	RSS-Gen 6.6	ANNEX A.3	Pass
5	Frequency Stability	2.1055 22.355 24.235 27.54	RSS-Gen 6.11 RSS-130 4.3 RSS-132 5.3 RSS-133 6.3 RSS-139 6.4 RSS-199 4.3	ANNEX A.4	Pass
6	Spurious Emission at Antenna Terminals	2.1051 22.917 24.238 27.53	RSS-Gen 6.13 RSS-130 4.6 RSS-132 5.5 RSS-133 6.5 RSS-139 6.6 RSS-199 4.5	ANNEX A.5	Pass
7	Band Edge	2.1051 22.917 24.238 27.53	RSS-130 4.6 RSS-132 5.5 RSS-133 6.5 RSS-139 6.6 RSS-199 4.5	ANNEX A.6	Pass
8	Field Strength of Spurious Radiation	2.1053 22.917 24.238 27.53	RSS-Gen 6.13 RSS-130 4.6 RSS-132 5.5 RSS-133 6.5 RSS-139 6.6	ANNEX A.7	Pass

No.	Description	FCC Part No.	ISED Part No.	Test Result	Verdict
			RSS-199 4.5		
9	Receiver Spurious Emissions	N/A	RSS-Gen 7.1 RSS-132 5.6 RSS-133 6.6	ANNEX A.8	Pass

Note: The only difference between the EUT (test samples in this report) and testing sample of report No.BL-EC1830166-501, which was issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 is that added ancillary equipment (added the barcode scanner and wrist belt). And EUT is the same. Therefore, only Field Strength of Spurious Radiation (Based on the original maximum power value, retested GSM850 Middle Channel, GSM1900 Low Channel, WCDMA B5 Low Channel and LTE B41 5MHz Low Channel) is retested, and other test result please refer to report No.BL-EC1830166-501, which was issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018.

4 GENERAL TEST CONFIGURATIONS

4.1 Test Environments

During the measurement, the environmental conditions were within the listed ranges:

Test Voltage of the EUT	NV (Normal Voltage)	3.8 V
	LV (Low Voltage)	3.7 V
	HV (High Voltage)	4.35 V
Test Temperature of the EUT	NT (Normal Temperature)	+25 °C
	LT (Low Temperature)	-20 °C
	HT (High Temperature)	+45 °C

4.2 Test Equipment List

Description	Manufacturer	Model	Serial No.	Software /Firmware Version	Cal. Date	Cal. Due
Conducted Test System						
Test Software 1	R&S	CMUgo	N/A	V2.0.1	N/A	N/A
Test Software 2	R&S	CMWRun	N/A	V1.8.9	N/A	N/A
Test Software 3	BALUN	BL410R	N/A	V2.1.1.366	N/A	N/A
Universal Radio Communication Tester	R&S	CMU 200	119280	V5.13	2018.03.16	2019.03.15
Wireless Communications Test Set	R&S	CMW 500	102318	V3.2.71	2017.06.12	2018.06.11
Wireless Communications Test Set	R&S	CMW 500	127801	V3.5.137	2017.11.02	2018.11.01
Spectrum Analyzer	R&S	FSV-30	103118	2.30.SP1	2017.06.12	2018.06.11
Spectrum Analyzer	AGILENT	E4440A	MY45304434	A.11.21	2017.11.02	2018.11.01
Spectrum Analyzer	AGILENT	E4440A	MY46181663	A.11.21	2017.11.02	2018.11.01
Temperature Chamber	AHK	SP20	1412	N/A	2017.07.20	2018.07.19
DC Power Supply	ITECH	IT6863A	60001401068 7210020	N/A	2017.06.12	2018.06.11
Power Sensor	AGILENT	E9304A H18	MY41497164	N/A	2017.11.02	2018.11.01
Power Splitter	KMW	DCPD-LDC	1305003215	N/A	N/A	N/A
Attenuator (20 dB)	KMW	ZA-S1-201	110617091	N/A	N/A	N/A
Attenuator (6 dB)	KMW	ZA-S1-61	1305003189	N/A	N/A	N/A
Radiated Test System						
Test Software	BALUN	BL410_E	N/A	V16.921	N/A	N/A

Description	Manufacturer	Model	Serial No.	Software /Firmware Version	Cal. Date	Cal. Due
Test Antenna-Loop(9 kHz-30 MHz)	SCHWARZBECK	FMZB 1519	1519-037	N/A	2017.11.07	2019.11.08
Test Antenna-Bi-Log(30 MHz-3 GHz)	SCHWARZBECK	VULB 9163	9163-624	N/A	2017.07.22	2019.07.21
Test Antenna-Biconical	SCHWARZBECK	VHBB9124	9124-594	N/A	2015.08.13	2018.08.12
Test Antenna-LPDA	SCHWARZBECK	VUSLP9111B	9111B-091	N/A	2015.08.13	2018.08.12
Test Antenna-Horn(1-18 GHz)	SCHWARZBECK	BBHA 9120D	9120D-1600	N/A	2016.07.12	2018.07.11
Test Antenna-Horn(18-40 GHz)	A-INFO	LB-180400KF	J211060273	N/A	2017.01.06	2019.01.05
Anechoic Chamber	EMC Electronic Co., Ltd	20.10m*11.60m*7.35m	N/A	N/A	2016.08.09	2018.08.08
EMI Receiver	AGILENT	E4440A	MY44020181	A.11.21	2018.03.16	2019.03.15
Wireless Communications Test Set	R&S	CMW 500	127794	V3.5.137	2017.11.02	2018.11.01

4.3 Test Configurations

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
E.R.P/E.I.R.P	GSM 850	v	v	v
	GSM 1900	v	v	v
	GPRS 850	v	v	v
	GPRS 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	CDMA BC 0	v	v	v
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
	HSDPA Band 2	v	v	v
	HSDPA Band 5	v	v	v
	HSUPA Band 2	v	v	v
	HSUPA Band 5	v	v	v
Peak to Average Ratio	CDMA BC 0	v	v	v
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Occupied Bandwidth	GSM 850	v	v	v
	GSM 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	CDMA BC 0	v	v	v
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Frequency Stability	GSM 850	v	v	v
	GSM 1900	v	v	v
	GPRS 850	v	v	v
	GPRS 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	CDMA BC 0	v	v	v
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Spurious Emission at Antenna Terminals	GSM 850	v	v	v
	GSM 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	CDMA BC 0	v	v	v

Test Items	Test Mode	Test Channel		
		LCH	MCH	HCH
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Band Edge	GSM 850	v	--	v
	GSM 1900	v	--	v
	EGPRS 850	v	--	v
	EGPRS 1900	v	--	v
	CDMA BC 0	v	--	v
	EVDO BC 0	v	--	v
	WCDMA Band 2	v	--	v
	WCDMA Band 5	v	--	v
Field Strength of Spurious Radiation	GSM 850	v	v	v
	GSM 1900	v	v	v
	EGPRS 850	v	v	v
	EGPRS 1900	v	v	v
	CDMA BC 0	v	v	v
	EVDO BC 0	v	v	v
	WCDMA Band 2	v	v	v
	WCDMA Band 5	v	v	v
Receiver Spurious Emissions	GSM 850	v	v	v
	GSM 1900	--	--	--
	EGPRS 850	--	--	--
	EGPRS 1900	--	--	--
	CDMA BC 0	--	--	--
	EVDO BC 0	--	--	--
	WCDMA Band 2	--	--	--
	WCDMA Band 5	--	--	--
Note 1: The mark "v" means that this configuration is chosen for testing.				

Test Mode	UL Channel	UL Channel No.	UL Frequency (MHz)
GSM/GPRS/EGPRS 850	Low Channel	128	824.2
	Middle Channel	190	836.6
	High Channel	251	848.8
GSM/GPRS/EGPRS 1900	Low Channel	512	1850.2
	Middle Channel	661	1880.0
	High Channel	810	1909.8
CDMA/EVDO BC 0	Low Channel	1013	824.70
	Middle Channel	384	836.52
	High Channel	777	848.31
WCDMA Band 2	Low Channel	9262	1852.4
	Middle Channel	9400	1880.0
	High Channel	9538	1907.6
WCDMA Band 5	Low Channel	4132	826.4
	Middle Channel	4182	836.4
	High Channel	4233	846.6

LTE Band	Bandwidth (MHz)						Modulation		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
E.R.P/E.I.R.P														
2	v	v	v	v	v	v	v	v	v	v	v	v	v	v
4	v	v	v	v	v	v	v	v	v	v	v	v	v	v
5	v	v	v	v	n	n	v	v	v	v	v	v	v	v
7	n	n	v	v	v	v	v	v	v	v	v	v	v	v
17	n	n	v	v	n	n	v	v	v	v	v	v	v	v
41	n	n	v	v	v	v	v	v	v	v	v	v	v	v
Peak to Average Ratio														
2	--	--	--	--	--	v	v	v	v	--	v	v	v	v
4	--	--	--	--	--	v	v	v	v	--	v	v	v	v
5	--	--	--	v	n	n	v	v	v	--	v	v	v	v
7	n	n	--	--	--	v	v	v	v	--	v	v	v	v
17	n	n	--	v	n	n	v	v	v	--	v	v	v	v
41	n	n	--	--	--	v	v	v	v	--	v	v	v	v
Occupied Bandwidth														
2	v	v	v	v	v	v	v	v	--	--	v	v	v	v
4	v	v	v	v	v	v	v	v	--	--	v	v	v	v
5	v	v	v	v	n	n	v	v	--	--	v	v	v	v
7	n	n	v	v	v	v	v	v	--	--	v	v	v	v
17	n	n	v	v	n	n	v	v	--	--	v	v	v	v
41	n	n	v	v	v	v	v	v	--	--	v	v	v	v
Frequency Stability														
2	--	--	--	v	--	--	v	v	--	--	v	--	v	--
4	--	--	--	v	--	--	v	v	--	--	v	--	v	--
5	--	--	--	v	n	n	v	v	--	--	v	--	v	--
7	n	n	--	v	--	--	v	v	--	--	v	--	v	--
17	n	n	--	v	n	n	v	v	--	--	v	--	v	--
41	n	n	--	v	--	--	v	v	--	--	v	--	v	--
Spurious Emission at Antenna Terminals														
2	v	v	v	v	v	v	v	v	v	--	--	v	v	v
4	v	v	v	v	v	v	v	v	v	--	--	v	v	v
5	v	v	v	v	n	n	v	v	v	--	--	v	v	v
7	n	n	v	v	v	v	v	v	v	--	--	v	v	v
17	n	n	v	v	n	n	v	v	v	--	--	v	v	v
41	n	n	v	v	v	v	v	v	v	--	--	v	v	v
Band Edge														
2	v	v	v	v	v	v	v	v	v	--	v	v	--	v
4	v	v	v	v	v	v	v	v	v	--	v	v	--	v
5	v	v	v	v	n	n	v	v	v	--	v	v	--	v
7	n	n	v	v	v	v	v	v	v	--	v	v	--	v
17	n	n	v	v	n	n	v	v	v	--	v	v	--	v
41	n	n	v	v	v	v	v	v	v	--	v	v	--	v

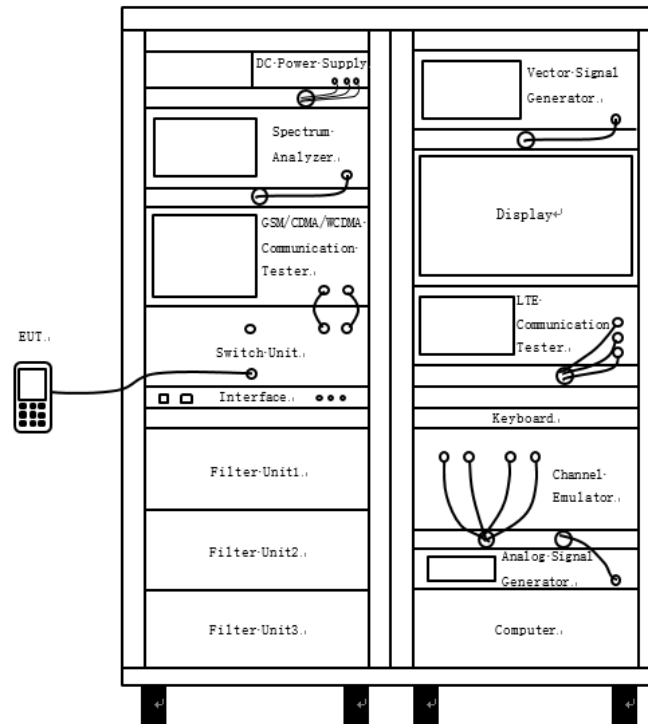
LTE Band	Bandwidth (MHz)						Modulation		RB#			Test Channel		
	1.4	3	5	10	15	20	QPSK	16-QAM	1	Half	Full	LCH	MCH	HCH
Field Strength of Spurious Radiation														
2	v	v	v	v	v	v	v	--	v	--	--	--	v	--
4	v	v	v	v	v	v	v	--	v	--	--	--	v	--
5	v	v	v	v	n	n	v	--	v	--	--	--	v	--
7	n	n	v	v	v	v	v	--	v	--	--	--	v	--
17	n	n	v	v	n	n	v	--	v	--	--	--	v	--
41	n	n	v	v	v	v	v	--	v	--	--	--	v	--
Note 1: The mark "v" means that this configuration is chosen for testing.														
Note 2: The mark "n" means that this bandwidth is not supported.														

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
LTE Band 2	Low Range	1.4	18607	1850.7
		3	18615	1851.5
		5	18625	1852.5
		10	18650	1855
		15	18675	1857.5
		20	18700	1860
	Middle Range	1.4/3/5/10/15/20	18900	1880
	High Range	1.4	19193	1909.3
		3	19185	1908.5
		5	19175	1907.5
		10	19150	1905
		15	19125	1902.5
		20	19100	1900
LTE Band 4	Low Range	1.4	19957	1710.7
		3	19965	1711.5
		5	19975	1712.5
		10	20000	1715
		15	20025	1717.5
		20	20050	1720
	Middle Range	1.4/3/5/10/15/20	20175	1732.5
	High Range	1.4	20393	1754.3
		3	20385	1753.5
		5	20375	1752.5
		10	20350	1750
		15	20325	1747.5
		20	20300	1745
LTE Band 5	Low Range	1.4	20407	824.7
		3	20415	825.5
		5	20425	826.5
		10	20450	829
	Middle Range	1.4/3/5/10	20525	836.5
	High Range	1.4	20643	848.3
		3	20635	847.5
		5	20625	846.5
		10	20600	844
LTE Band 7	Low Range	5	20775	2502.5
		10	20800	2505
		15	20825	2507.5
		20	20850	2510
	Middle Range	5/10/15/20	21100	2535
	High Range	5	21425	2567.5
		10	21400	2565

Test Mode	UL Channel	Channel Bandwidth (MHz)	UL Channel No.	UL Frequency (MHz)
		15	21375	2562.5
		20	21350	2560
LTE Band 17	Low Range	5	23755	706.5
		10	23780	709
	Middle Range	5/10	23790	710
	High Range	5	23825	713.5
		10	23800	711
LTE Band 41	Low Range	5	40265	2557.5
		10	40290	2560
		15	40315	2562.5
		20	40340	2565
	Middle Range	5/10/15/20	40740	2605
	High Range	5	41215	2652.5
		10	41190	2650
		15	41165	2647.5
		20	41140	2645

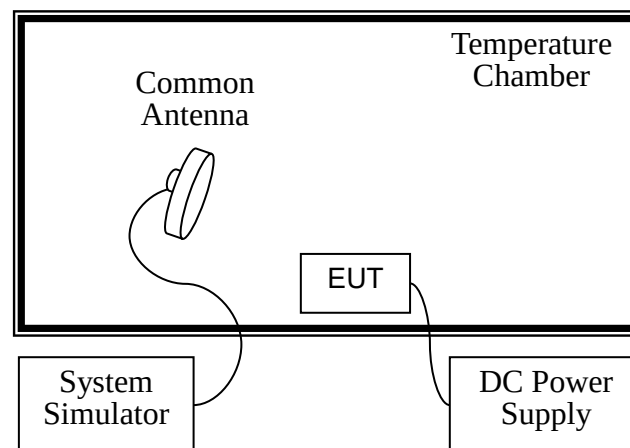
4.4 Test Setup

4.4.1 For Antenna Port Test



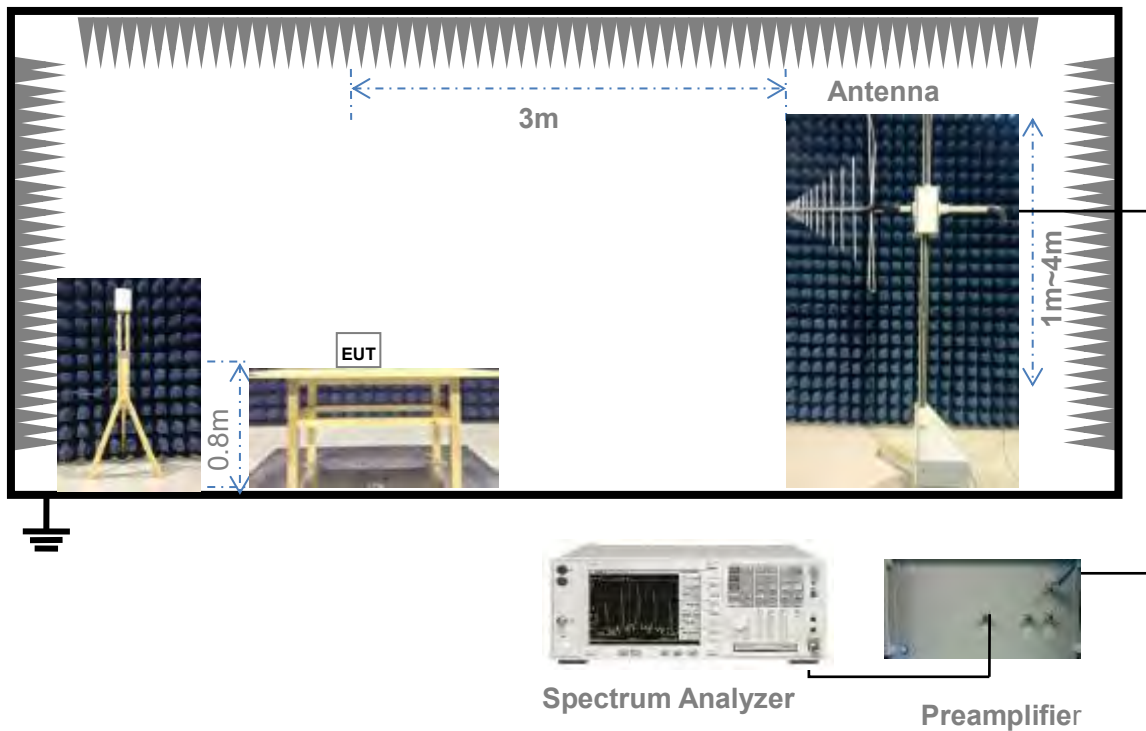
(Diagram 1)

4.4.2 For Frequency Stability Test



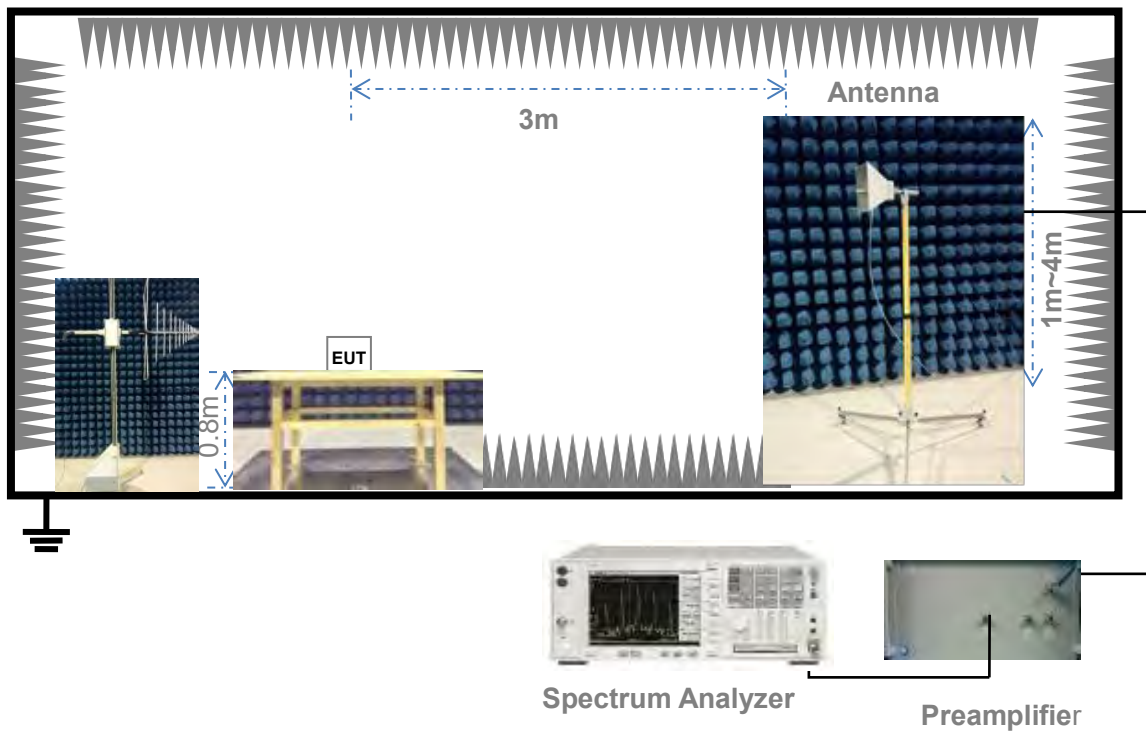
(Diagram 2)

4.4.3 For Radiated Test (30 MHz ~ 1 GHz)



(Diagram 3)

4.4.4 For Radiated Test (Above 1 GHz)



(Diagram 4)

5 TEST ITEMS

5.1 Transmitter Radiated Power (EIRP/ERP)

5.1.1 Limit

FCC § 2.1046 & 22.913(a) & 24.232(c) & 27.50(a) & 27.50(b) & 27.50(c) & 27.50(d) & 27.50(h)

According to FCC section 22.913(a) (5), the Effective Radiated Power (ERP) of mobile transmitters and auxiliary test transmitters must not exceed 7 watts.

According to FCC section 24.232(c), mobile and portable stations are limited to 2 watts EIRP and the equipment must employ a means for limiting power to the minimum necessary for successful communications.

According to FCC section 27.50(a) (3), for mobile and portable stations transmitting in the 2305-2315MHz band or the 2350-2360MHz band, the average EIRP must not exceed 50 milliwatts within any 1 megahertz of authorized bandwidth, except that for mobile and portable stations compliant with 3GPP LTE standards.

FCC section 27.50(b) (10), portable stations (hand-held devices) transmitting in the 746-757MHz, 776-788MHz, and 805-806MHz bands are limited to 3 watts ERP.

FCC section 27.50(c) (10), portable stations (hand-held devices) in the 600MHz uplink band and the 698-746MHz band, and fixed and mobile stations in the 600MHz uplink band are limited to 3 watts ERP.

FCC section 27.50(d) (4), fixed, mobile, and portable (hand-held) stations operating in the 1710-1755 MHz band and mobile and portable stations operating in the 1695-1710 MHz and 1755-1780 MHz bands are limited to 1 watt EIRP. Fixed stations operating in the 1710-1755 MHz band are limited to a maximum antenna height of 10 meters above ground. Mobile and portable stations operating in these bands must employ a means for limiting power to the minimum necessary for successful communications.

(7) Fixed, mobile, and portable (hand-held) stations operating in the 2000-2020 MHz band are limited to 2 watts EIRP.

And FCC section 27.50(h) (2), for mobile and other user stations, mobile stations are limited to 2.0 watts EIRP. All user stations are limited to 2.0 watts transmitter output power.

RSS-Gen § 6.12 & RSS-130 § 4.4 & RSS-132 § 5.4 & RSS-133 § 6.4 & RSS-139 § 6.5 & RSS-199 § 4.4

According to RSS-130 § 4.4, the e.i.r.p shall not exceed 50 watts for mobile equipment or for outdoor fixed subscriber equipment, nor shall it exceed 5 watts for portable equipment or for indoor fixed subscriber equipment.

According to RSS-132 § 5.4, the Effective Radiated Power (ERP) for mobile equipment shall not exceed 11.5 watts.

According to RSS-133 § 6.4 (SRSP 510), mobile stations and hand-held portables are limited to 2 watts maximum EIRP.

According to RSS-139 § 6.5, the EIRP for mobile and portable transmitters shall not exceed 1 watt.

According to RSS-199 § 4.4, for mobile subscriber equipment, the EIRP shall not exceed 2 watts.

5.1.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for conducted test, and the section 4.4.3 and 4.4.4 (Diagram 3, 4) test setup description is used for radiated test. The photo of test setup please refer to ANNEX B.

5.1.3 Test Procedure

Description of the Conducted Output Power Measurement

The EUT is coupled to the SS with attenuator through power splitter; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading. A system simulator is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power. The measured power in the radio frequency on the transmitter output terminals shall be reported.

The relevant equation for determining the conducted measured value is:

$$\text{Conducted Output Power Value (dBm)} = \text{Measured Value (dBm)} + \text{Path Loss (dB)}$$

where:

Conducted Output Power Value = final conducted measured value in the conducted power test, in dBm;

Measured Value = measured conducted power received by spectrum analyzer or power meter, in dBm;

Path Loss = signal attenuation in the connecting cable between the transmitter and spectrum analyzer or power meter, including external cable loss, in dB;

During the test, the data of Path Loss (dB) is added in the spectrum analyzer or power meter, so Measured Value (dBm) is the final values which contains the data of Path Loss (dB).

For example:

In the conducted output power test, when measured value for GSM850 is 24.7 dBm, and path loss is 8.5 dB, then final conducted output power value is:

$$\text{Conducted Output Power Value (dBm)} = 24.7 \text{ dBm} + 8.5 \text{ dB} = 33.2 \text{ dBm}$$

Description of the Transmitter Radiated Power Measurement

In many cases, the RF output power limits for licensed digital transmission devices is specified in terms of effective radiated power (ERP) or equivalent isotropic radiated power (EIRP). Typically, ERP is specified when the operating frequency is less than or equal to 1 GHz and EIRP is specified when the operating frequency is greater than 1 GHz. Both are determined by adding the transmit antenna gain to the conducted RF output power with the primary difference between the two being that when determining the ERP, the transmit antenna gain is referenced to a dipole antenna (i.e., dBd) whereas when determining the EIRP, the transmit antenna gain is referenced to an isotropic antenna (dBi).

Final measurement calculation as below:

The relevant equation for determining the ERP or EIRP from the conducted RF output power measured using the guidance provided above is:

$$\text{ERP/EIRP} = P_{\text{Meas}} + \text{GT} - \text{LC}$$

where:

ERP/EIRP = effective or equivalent radiated power, respectively (expressed in the same units as P_{Meas} , typically dBW or dBm);

P_{Meas} = measured transmitter output power or PSD, in dBm or dBW;

GT = gain of the transmitting antenna, in dBd (ERP) or dBi (EIRP);

dBd (ERP)=dBi (EIRP) -2.15 dB

LC = signal attenuation in the connecting cable between the transmitter and antenna, in dB.

For devices utilizing multiple antennas, KDB 662911 provides guidance for determining the effective array transmit antenna gain term to be used in the above equation.

For example:

In the EIRP test, when P_{Meas} value for GSM1900 is 30.2 dBm, LC is 0.6 dB, and GT is -3.4 dB, then final EIRP value is:

$$\text{EIRP for GSM1900} = 30.2 \text{ dBm} - 3.4 \text{ dBi} - 0.6 \text{ dB} = 26.2 \text{ dBm}$$

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:

$$\text{ERP/EIRP (dBm)} = \text{SA Read Value (dBm)} + \text{Correction Factor (dB)}$$

where:

ERP/EIRP = effective or equivalent radiated power, in dBm;

SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;

Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

$$\text{ERP (dBm)} = 21\text{dBm} + 8\text{dB} = 29\text{dBm}$$

5.1.4 Test Result

Please refer to ANNEX A.1.

5.2 Peak to Average Ratio

5.2.1 Limit

FCC § 2.1046 & 24.232(d) & 27.50(d)

RSS-130 § 4.4 & RSS-132 § 5.4 & RSS-133 § 6.4 & RSS-139 § 6.5 & RSS-199 § 4.4

In addition, when the transmitter power is measured in terms of average value, the peak-to-average power ratio (PAPR) of the transmitter shall not exceed 13 dB for more than 0.1% of the time using a signal corresponding to the highest PAPR during periods of continuous transmission.

According to FCC section 24.232(d), power measurements for transmissions by stations authorized under this section may be made either in accordance with a Commission-approved average power technique or in compliance with 24.232 (e) of this section. In both instances, equipment employed must be authorized in accordance with the provisions of § 24.51. In measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

FCC section 24.232(e), peak transmit power must be measured over any interval of continuous transmission using instrumentation calibrated in terms of an rms equivalent voltage. The measurement results shall be properly adjusted for any instrument limitations, such as detector response times, limited resolution bandwidth capability when compared to the emission bandwidth, sensitivity, etc., so as to obtain a true peak measurement for the emission in question over the full bandwidth of the channel.

According to FCC section 27.50(d) (5), in measuring transmissions in this band using an average power technique, the peak-to-average ratio (PAR) of the transmission may not exceed 13dB.

5.2.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.2.3 Test Procedure

Here the lowest, middle and highest channels are selected to perform testing to verify the peak-to-average ratio.

According to KDB 971168 D01, there is CCDF procedure for PAPR:

- a) Refer to instrument's analyzer instruction manual for details on how to use the power statistics/CCDF function;
- b) Set resolution/measurement bandwidth $\geq$ signal's occupied bandwidth;
- c) Set the number of counts to a value that stabilizes the measured CCDF curve;
- d) Set the measurement interval as follows:
 - 1) for continuous transmissions, set to 1 ms,
 - 2) for burst transmissions, employ an external trigger that is synchronized with the EUT burst timing sequence, or use the internal burst trigger with a trigger level that allows the burst to stabilize and set the measurement interval to a time that is less than or equal to the burst duration.

e) Record the maximum PAPR level associated with a probability of 0.1%.

Alternate procedure for PAPR:

Use one of the procedures presented in 4.1 to measure the total peak power and record as P_{Pk} . Use one of the applicable procedures presented 4.2 to measure the total average power and record as P_{Avg} . Both the peak and average power levels must be expressed in the same logarithmic units (e.g., dBm). Determine the PAPR from:

$$\text{PAPR (dB)} = P_{Pk} \text{ (dBm)} - P_{Avg} \text{ (dBm)}.$$

5.2.4 Test Result

Please refer to ANNEX A.2.

5.3 Occupied Bandwidth

5.3.1 Limit

FCC § 2.1049

RSS-Gen § 6.6

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Many of the individual rule parts specify a relative OBW in lieu of the 99% OBW. In such cases, the OBW is defined as the width of the signal between two points, one below the carrier center frequency and on above the carrier center frequency, outside of which all emissions are attenuated by at least X dB below the transmitter power, where the value of X is typically specified as 26.

5.3.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.3.3 Test Procedure

The following procedure shall be used for measuring power bandwidth.

a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be set wide enough to capture all modulation products including the emission skirts (i.e., two to five times the anticipated OBW).

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1 to 5 % of the anticipated OBW, and the VBW shall be at least 3 times the RBW.

c) Set the reference level of the instrument as required to keep the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope must be at least $10\log(\text{OBW} / \text{RBW})$ below the reference level.

d) NOTE—Steps a) through c) may require iteration to adjust within the specified tolerances.

e) For -26 dB OBW, the dynamic range of the spectrum analyzer at the selected RBW shall be at least 10dB below the target “-X dB down” requirement, e.g. -26 dB OBW, the spectrum analyzer noise floor at the selected RBW shall be 36dB below the reference value.

f) Set the detection mode to peak, and the trace mode to max hold.

g) For 99% OBW, use the 99 % power bandwidth function of the spectrum analyzer (if available) and report the measured bandwidth.

If the instrument does not have a 99 % power bandwidth function, the trace data points are to be recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5 % of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5 % of the total is reached; that frequency is recorded as the upper frequency.

The 99 % power bandwidth is the difference between these two frequencies.

h) For -26 dB OBW, determine the reference value: Set the EUT to transmit a modulated signal. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value).

Determine the “-X dB down amplitude” as equal to (reference value -X). Alternatively, this calculation can be performed by the analyzer by using the marker-delta function.

Place two markers, one at the lowest and the other at the highest frequency of the envelope of the spectral display such that each marker is at or slightly below “-X dB down amplitude” determined in step g). If a marker is below this “-X dB down amplitude” value it shall be placed as close as possible to this value. The OBW is the positive frequency difference between the two markers.

i) The OBW shall be reported by providing plot(s) of the measuring instrument display. The frequency and amplitude axes and scale shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

j) Change variable modulations, coding, or channel bandwidth settings, then repeat above test procedures.

5.3.4 Test Result

Please refer to ANNEX A.3.

5.4 Frequency Stability

5.4.1 Limit

FCC § 2.1055 & 22.355 & 24.235 & 27.54

RSS-Gen § 6.11 & RSS-130 § 4.3 & RSS-132 § 5.3 & RSS-133 § 6.3 & RSS-139 § 6.4 & RSS-199 § 4.3

FCC § 2.1055 & RSS-Gen § 6.11

The frequency stability shall be measured with variation of ambient temperature as follows:

(1) The temperature is varied from -30°C to +50°C.

(2) Frequency measurements shall be made at the extremes of the specified temperature range and at intervals of not more than 10°C through the range.

The frequency stability shall be measured with variation of primary supply voltage as follows:

(1) Vary primary supply voltage from 85 to 115 percent of the nominal value for other than carried battery equipment.

(2) For hand carried, battery powered equipment, reduce primary supply voltage to the battery operating and point which shall be specified by the manufacture.

(3) The supply voltage shall be measured at the input to the cable normally provided with the equipment, or at the power supply terminals if cables are not normally provided.

FCC § 22.355

Except as otherwise provided in this part, the carrier frequency of each transmitter in the Public Mobile Services must be maintained within the tolerances given in Table C-1 of this section.

Table C-1—Frequency Tolerance for Transmitters in the Public Mobile Services

Frequency range (MHz)	Base, fixed (ppm)	Mobile > 3 watts (ppm)	Mobile ≤ 3 watts (ppm)
25 to 50	20.0	20.0	50.0
50 to 450	5.0	5.0	50.0
450 to 512	2.5	5.0	5.0
821 to 896	1.5	2.5	2.5
928 to 929	5.0	n/a	n/a
929 to 960	1.5	n/a	n/a
2110 to 2220	10.0	n/a	n/a

FCC § 24.235

The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block.

FCC § 27.54

The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

RSS-130 § 4.3

The frequency offset shall be measured according to the procedure described in RSS-Gen and recorded.

RSS-132 § 5.3

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.5 ppm for base stations.

RSS-133 § 6.3

The carrier frequency shall not depart from the reference frequency in excess of ± 2.5 ppm for mobile stations and ± 1.0 ppm for base stations.

RSS-139 § 6.4

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

RSS-199 § 4.3

The frequency stability shall be sufficient to ensure that the occupied bandwidth stays within the operating frequency block when tested to the temperature and supply voltage variations specified in RSS-Gen.

5.4.2 Test Setup

The section 4.4.2 (Diagram 2) test setup description is used for this test. The photo of test setup please refer to ANNEX B.

5.4.3 Test Procedure

1. The EUT is placed in a temperature chamber.
2. The temperature is set to 25°C and allowed to stabilize. After sufficient soak time, the transmitting frequency error is measured.
3. The temperature is increased by not more than 10 degrees, allowed to stabilize and soak, and then repeat the frequency error measurement.
4. Repeat procedure 3 until +50°C and -30°C is reached.
5. Change supply voltage, and repeat measurement until extreme voltage is reached.

5.4.4 Test Result

Please refer to ANNEX A.4.

5.5 Spurious Emission at Antenna Terminals

5.5.1 Limit

FCC § 2.1051 & 22.917(a) & 24.238(a) & 27.53(a) & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(m)

RSS-Gen § 6.13 & RSS-130 § 4.6 & RSS-132 § 5.5 & RSS-133 § 6.5 & RSS-139 § 6.6 & RSS-199 § 4.5

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC § 22.917(a) & 24.238(a) & RSS-132 § 5.5 & RSS-133 § 6.5

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This is calculated to be -13 dBm.

FCC § 27.53(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1) By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337MHz.

(2) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2300 and 2305MHz, $55 + 10 \log(P)$ dB on all frequencies between 2296 and 2300MHz, $61 + 10 \log(P)$ dB on all frequencies between 2292 and 2296MHz, $67 + 10 \log(P)$ dB on all frequencies between 2288 and 2292MHz, and $70 + 10 \log(P)$ dB below 2288MHz.

(3) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2360 and 2365MHz, and not less than $70 + 10 \log(P)$ dB below 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC § 27.53(h) (1) & RSS-139 § 6.6

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

FCC § 27.53(m) (4) & RSS-199 § 4.5

For mobile digital stations (BRS and EBS stations), the attenuation factor shall be not less than:

- $40 + 10 \log P$ dB (–10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.
- $43 + 10 \log P$ dB (–13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,
- $55 + 10 \log P$ dB (–25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB).

In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-130 § 4.6

The power of any unwanted emissions in any 100kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10\log_{10}P$ (watts), dB. However, in the bandwidth of 30kHz may be employed.

5.5.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.5.3 Test Procedure

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. On any frequency outside a licensee's frequency block, the power of any emission shall be attenuated below the transmitter power (P) by at least $43 + 10 \log(P)$ dB. Compliance with these provisions is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency blocks a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

1. The EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.
2. CMW500 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.
3. The RF output of the transmitter is connected to the input of the spectrum analyzer through sufficient attenuation.
4. Spurious emissions are tested with 0.001MHz RBW for frequency less than 150kHz, 0.01MHz RBW for frequency less than 30MHz, 0.1MHz RBW for frequency less than 1GHz, and 1MHz RBW for frequency above 1GHz. And sweep point number are at least 401, referring to following formula.

$$\text{Sweep point number} = \text{Span/RBW}$$

$$\text{VBW} = 3 * \text{RBW}$$

$$\text{Detector Mode} = \text{mean or average power}$$

5. Record the frequencies and levels of spurious emissions.

5.5.4 Test Result

Please refer to ANNEX A.5.

5.6 Band Edge

5.6.1 Limit

FCC § 2.1051 & 22.917(a) & 24.238(a) & 27.53(a) & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(m)

RSS-130 § 4.6 & RSS-132 § 5.5 & RSS-133 § 6.5 & RSS-139 § 6.6 & RSS-199 § 4.5

In the 1 MHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed.

The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

FCC § 22.917(a) & 24.238(a) & RSS-132 § 5.5 & RSS-133 § 6.5

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This is calculated to be -13 dBm.

FCC § 27.53(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1) By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337MHz.

(2) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2300 and 2305MHz, $55 + 10 \log(P)$ dB on all frequencies between 2296 and 2300MHz, $61 + 10 \log(P)$ dB on all frequencies between 2292 and 2296MHz, $67 + 10 \log(P)$ dB on all frequencies between 2288 and 2292MHz, and $70 + 10 \log(P)$ dB below 2288MHz.

(3) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2360 and 2365MHz, and not less than $70 + 10 \log(P)$ dB below 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log (P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log (P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43 + 10 \log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC § 27.53(h) (1) & RSS-139 § 6.6

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10} (P)$ dB.

FCC § 27.53(m) (4) & RSS-199 § 4.5

For mobile digital stations (BRS and EBS stations), the attenuation factor shall be not less than:

- $40 + 10 \log P$ dB (–10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.
- $43 + 10 \log P$ dB (–13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,
- $55 + 10 \log P$ dB (–25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB).

In addition, the attenuation factor shall not be less than $43 + 10 \log (P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log (P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-130 § 4.6

The power of any unwanted emissions in any 100kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10\log_{10}P$ (watts), dB. However, in the bandwidth of 30kHz may be employed.

5.6.2 Test Setup

The section 4.4.1 (Diagram 1) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.6.3 Test Procedure

The EUT, which is powered by the Battery, is coupled to the Spectrum Analyzer (SA) and the System Simulator (SS) with attenuators through the Power Splitter; the RF load attached to the EUT antenna terminal is 50 Ohm; the path loss as the factor is calibrated to correct the reading.

1. The EUT is coupled to the system simulator and spectrum analyzer; the RF load attached to EUT antenna terminal is 50Ohm; the path loss as the factor is calibrated to correct the reading.
2. CMW500 is used to establish communication with the EUT, and its parameters are set to force the EUT transmitting at maximum output power.
3. The RF output of the transmitter is connected to the input of the spectrum analyzer through sufficient attenuation.
4. The center of the spectrum analyzer was set to block edge frequency.
5. Band edge are tested with $1\% \cdot \text{cBW}$ (RBW), and sweep point number referred to following formula.

$$\text{Sweep point number} = 2 \cdot \text{Span} / \text{RBW}$$

$$\text{VBW} = 3\text{RBW}$$

6. Record the frequencies and levels of spurious emissions.

5.6.4 Test Result

Please refer to ANNEX A.6.

5.7 Field Strength of Spurious Radiation

5.7.1 Limit

FCC § 2.1053 & 22.917(a) & 24.238(a) & 27.53(a) & 27.53(c) & 27.53(g) & 27.53(h) & 27.53(m)

RSS-Gen § 6.13 & RSS-130 § 4.6 & RSS-132 § 5.5 & RSS-133 § 6.5 & RSS-139 § 6.6 & RSS-199 § 4.5

FCC § 22.917(a) & 24.238(a) & RSS-132 § 5.5 & RSS-133 § 6.5

The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least $43 + 10 \log(P)$ dB. This is calculated to be -13 dBm.

FCC § 27.53(a) (4)

For mobile and portable stations operating in the 2305-2315MHz and 2350-2360MHz bands:

(1) By a factor of not less than: $43 + 10 \log(P)$ dB on all frequencies between 2305 and 2320MHz and on all frequencies between 2345 and 2360MHz that are outside the licensed band(s) of operation, not less than $55 + 10 \log(P)$ dB on all frequencies between 2320 and 2324MHz and on all frequencies between 2341 and 2345MHz, not less than $61 + 10 \log(P)$ dB on all frequencies between 2324 and 2328MHz and on all frequencies between 2337 and 2341MHz, and not less than $67 + 10 \log(P)$ dB on all frequencies between 2328 and 2337MHz.

(2) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2300 and 2305MHz, $55 + 10 \log(P)$ dB on all frequencies between 2296 and 2300MHz, $61 + 10 \log(P)$ dB on all frequencies between 2292 and 2296MHz, $67 + 10 \log(P)$ dB on all frequencies between 2288 and 2292MHz, and $70 + 10 \log(P)$ dB below 2288MHz.

(3) By a factor of not less than $43 + 10 \log(P)$ dB on all frequencies between 2360 and 2365MHz, and not less than $70 + 10 \log(P)$ dB below 2365MHz.

FCC § 27.53(c)

For operations in the 746–758 MHz band and the 776–788 MHz band, the power of any emission outside the licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, in accordance with the following:

(1) On any frequency outside the 746–758 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(2) On any frequency outside the 776–788 MHz band, the power of any emission shall be attenuated outside the band below the transmitter power (P) by at least $43 + 10 \log(P)$ dB;

(3) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $76 + 10 \log(P)$ dB in a 6.25 kHz band segment, for base and fixed stations;

(4) On all frequencies between 763–775 MHz and 793–805 MHz, by a factor not less than $65 + 10 \log(P)$ dB in a 6.25 kHz band segment, for mobile and portable stations;

(5) Compliance with the provisions of paragraphs (c)(1) and (c)(2) of this section is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater.

However, in the 100 kHz bands immediately outside and adjacent to the frequency block, a resolution bandwidth

of at least 30 kHz may be employed;

(6) Compliance with the provisions of paragraphs (c)(3) and (c)(4) of this section is based on the use of measurement instrumentation such that the reading taken with any resolution bandwidth setting should be adjusted to indicate spectral energy in a 6.25 kHz segment.

FCC § 27.53(g)

For operations in the 600MHz band and the 698-746MHz band, the power of any emission outside a licensee's frequency band(s) of operation shall be attenuated below the transmitter power (P) within the licensed band(s) of operation, measured in watts, by at least $43+10\log(P)$ dB. Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz bands immediately outside and adjacent to a licensee's frequency block, a resolution bandwidth of at least 30 kHz may be employed.

FCC § 27.53(h) (1) & RSS-139 § 6.6

Except as otherwise specified below, for operations in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz, and 2180-2200 bands, the power of any emission outside a licensee's frequency block shall be attenuated below the transmitter power (P) in watts by at least $43 + 10 \log_{10}(P)$ dB.

FCC § 27.53(m) (4) & RSS-199 § 4.5

For mobile digital stations (BRS and EBS stations), the attenuation factor shall be not less than:

- $40+10\log P$ dB (–10 dBm, 100 nW) on all frequencies between the channel edge and 5 MHz from the channel edge.
- $43+10\log P$ dB (–13 dBm, 50 nW) on all frequencies between 5 MHz and X MHz from the channel edge,
- $55+10\log P$ dB (–25 dBm, 3 nW) on all frequencies more than X MHz from the channel edge, where X is the greater of 6 MHz or the actual emission bandwidth (26 dB).

In addition, the attenuation factor shall not be less than $43 + 10 \log(P)$ dB on all frequencies between 2490.5 MHz and 2496 MHz and $55 + 10 \log(P)$ dB at or below 2490.5 MHz. Mobile Satellite Service licensees operating on frequencies below 2495 MHz may also submit a documented interference complaint against BRS licensees operating on channel BRS Channel 1 on the same terms and conditions as adjacent channel BRS or EBS licensees.

RSS-130 § 4.6

The power of any unwanted emissions in any 100kHz bandwidth on any frequency outside the frequency range(s) within which the equipment is designed to operate shall be attenuated below the transmitter power, P (dBW), by at least $43 + 10\log_{10}P$ (watts), dB. However, in the bandwidth of 30kHz may be employed.

5.7.2 Test Setup

The section 4.4.3 and 4.4.4 (Diagram 3, 4) test setup description was used for this test. The photo of test setup please refer to ANNEX B.

5.7.3 Test Procedure

1. On a test site, the EUT shall be placed at 80cm height on a turn table, and in the position close to normal use as declared by the applicant.
2. The test antenna shall be oriented initially for vertical polarization located 3 m from EUT to correspond to the fundamental frequency of the transmitter.
3. The output of the test antenna shall be connected to the measuring receiver and the peak detector is used for the measurement.
4. During the measurement of the EUT, the resolution bandwidth was to 1 MHz and the average bandwidth was set to 1 MHz.
5. The transmitter shall be switched on; the measuring receiver shall be tuned to the frequency of the transmitter under test.
6. The test antenna shall be raised and lowered through the specified range of height until the maximum signal level is detected by the measuring receiver.
7. The transmitter shall be rotated through 360° in the horizontal plane, until the maximum signal level is detected by the measuring receiver.
8. The test antenna shall be raised and lowered again through the specified range of height until the maximum signal level is detected by the measuring receiver.
9. The maximum signal level detected by the measuring receiver shall be noted.
10. The EUT was replaced by half-wave dipole (824 ~ 849 MHz) or horn antenna (1 850 ~ 1 910 MHz) connected to a signal generator.
11. In necessary, the input attenuator setting on the measuring receiver shall be adjusted in order to increase the sensitivity of the measuring receiver.
12. The test antenna shall be raised and lowered through the specified range of height to ensure that the maximum signal is received.
13. The input signal to the substitution antenna shall be adjusted to the level that produces a level detected by the measuring receiver, which is equal to the level noted while the transmitter radiated power was measured, corrected for the change of input attenuator setting of the measuring receiver.
14. The input level to the substitution antenna shall be recorded as power level in dBm, corrected for any change of input attenuator setting of the measuring receiver.
15. The measurement shall be repeated with the test antenna and the substitution antenna orientated for horizontal polarization.

Final measurement calculation as below:

The relevant equation for determining the ERP/EIRP from the radiated RF output power is:

$$\text{ERP/EIRP (dBm)} = \text{SA Read Value (dBm)} + \text{Correction Factor (dB)}$$

where:

ERP/EIRP = effective or equivalent radiated power, in dBm;

SA Read Value = measured transmitter power received by EMI receiver or spectrum analyzer, in dBm;

Correction Factor = total correction factor including cable loss, in dB;

During the test, the data of Correction Factor (dB) is added in the EMI receiver or spectrum analyzer, so SA Read Value (dBm) is the final values which contains the data of Correction Factor (dB).

For example:

In the ERP test, when SA read value for GSM850 is 21dBm, and correction factor is 8dB, then final ERP value for GSM850 is:

$$\text{ERP (dBm)} = 21\text{dBm} + 8\text{dB} = 29\text{dBm}$$

5.7.4 Test Result

Please refer to ANNEX A.7.

5.8 Receiver Spurious Emissions

RSS-Gen § 7.1 & RSS-132 § 5.6 & RSS-133 § 6.6

For emissions at frequencies below 1 GHz, measurements shall be performed using a CISPR quasi-peak detector and the related measurement bandwidth. At frequencies above 1 GHz, measurements shall be performed using a linear average detector with a minimum resolution bandwidth of 1 MHz.

As an alternative to CISPR quasi-peak or average measurements, compliance with the emission limit can be demonstrated using measuring equipment employing a peak detector function properly adjusted for factors such as pulse desensitization, as required, with a measurement bandwidth equal to, or greater than, the applicable CISPR quasi-peak bandwidth or 1 MHz bandwidth, respectively.

Receiver Radiated Limits

Radiated emission measurements shall be performed with the receiver antenna connected to the receiver antenna terminals. The search for spurious emissions shall be from the lowest frequency internally generated or used in the receiver (e.g. local oscillator, intermediate or carrier frequency), or 30 MHz, whichever is higher, to at least 5x the highest tunable or local oscillator frequency, whichever is higher, without exceeding 40 GHz.

Spurious emissions from receivers shall not exceed the radiated limits shown in Table 2 below:

Table 2 – Receiver Radiated Limits

Frequency (MHz)	Field Strength ($\mu\text{V/m}$ at 3 metres)
30-88	100
88-216	150
216-960	200
Above 960	500

Receiver Conducted Limits

If the receiver has a detachable antenna of known impedance, an antenna-conducted spurious emissions measurement is permitted as an alternative to radiated measurement. However, the radiated method is preferred.

The antenna-conducted test shall be performed with the antenna disconnected and with the receiver antenna terminals connected to a measuring instrument having equal impedance to that specified for the antenna.

The receiver-spurious emissions measured at the antenna terminals by the antenna-conducted method shall then comply with the following limits:

Receiver-spurious emissions at any discrete frequency shall not exceed 2 nW in the band 30-1000 MHz, nor 5 nW above 1000 MHz.

ANNEX A TEST RESULTS

A.1 Transmitter Radiated Power (EIRP/ERP)

Note: Transmitter Radiated Power (EIRP/ERP) test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.1 Transmitter Radiated Power (EIRP/ERP).

A.2 Peak to Average Ratio

Note: Peak to Average Ratio test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.2 Peak to Average Ratio.

A.3 Occupied Bandwidth

Note: Occupied Bandwidth test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.3 Occupied Bandwidth.

A.4 Frequency Stability

Note: Frequency Stability test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.4 Frequency Stability.

A.5 Spurious Emission at Antenna Terminals

Note: Spurious Emission at Antenna Terminals test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.5 Spurious Emission at Antenna Terminals.

A.6 Band Edge

Note: Band Edge test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A. 6 Band Edge.

A.7 Field Strength of Spurious Radiation

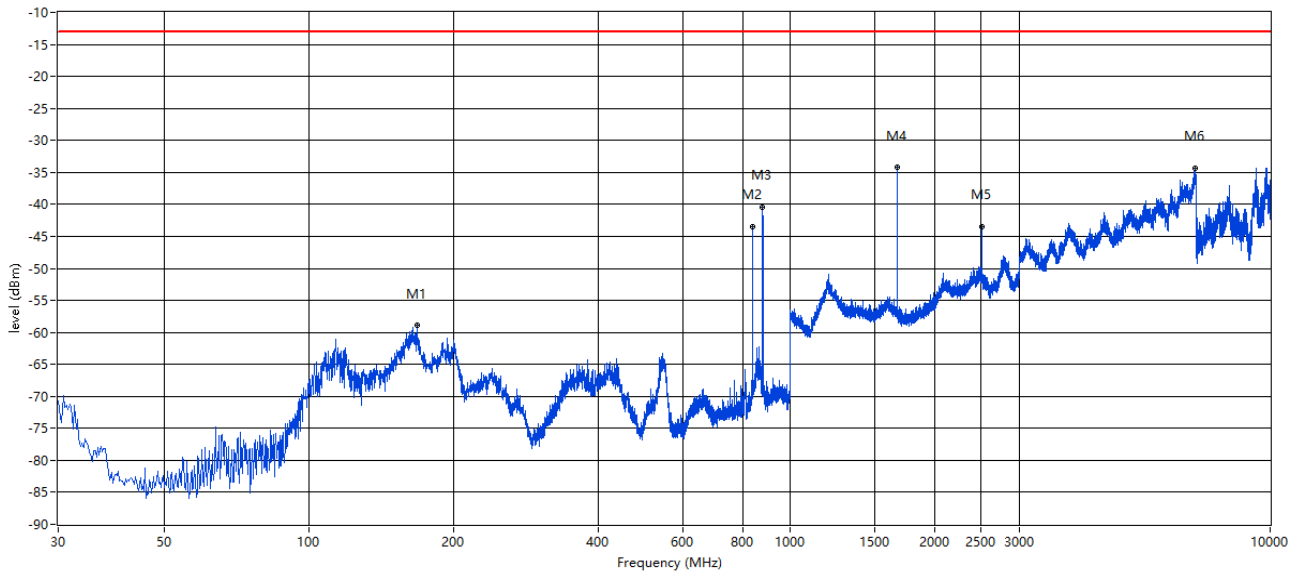
Note 1: Field Strength of Spurious Radiation other configuration test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.7 Field Strength of Spurious Radiation.

Note 2: The frequencies of verdict which are marked by "N/A" should be ignored because they are UE carrier frequency.

Note 3: When measurement frequency is above 18GHz, there is only noise floor of test system existing. So that there is no test data above 18GHz in this report.

GSM 850 Middle Channel, 30MHz-10GHz, RSE-H

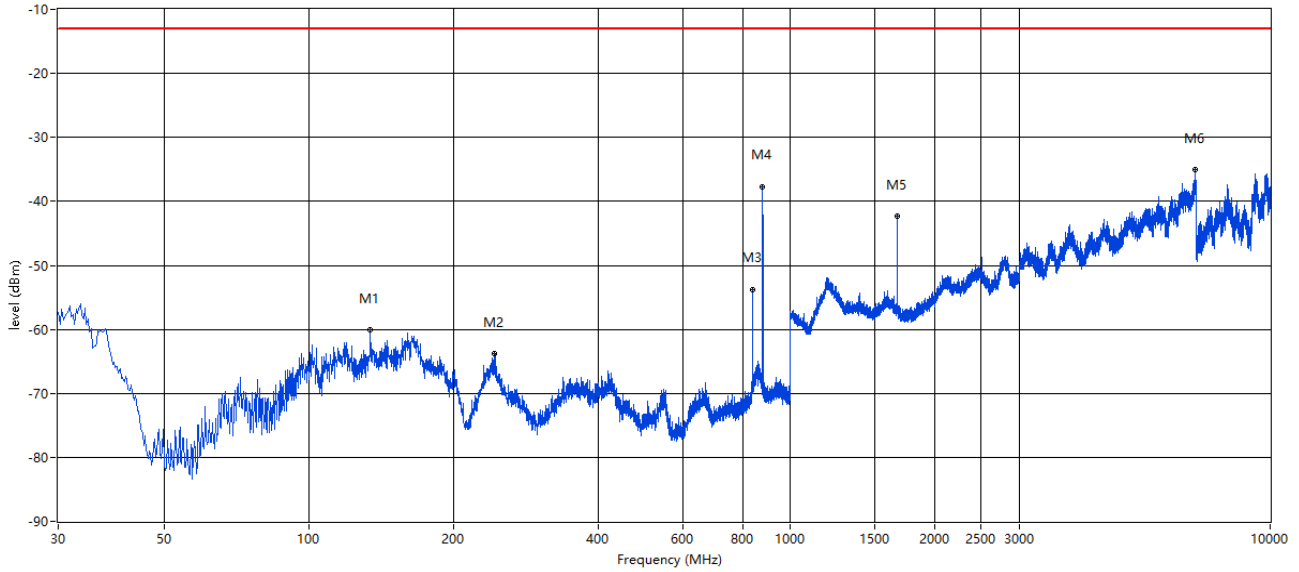
RSE Test case_CE FCC_FCC PART22&24&27_FCC PART 22_850_GSM 850&CDMA BC0&WCDMA B5<E B5&26



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
167.221	-58.84	-17.33	-13.0	45.84	93.70	Horizontal	Horizontal	Pass
836.353	-43.51	3.25	-13.0	30.51	75.10	Horizontal	Horizontal	N.A
881.871	-40.42	2.11	-13.0	27.42	117.60	Horizontal	Horizontal	N.A
1672.832	-34.18	-1.26	-13.0	21.18	65.90	Horizontal	Horizontal	Pass
2509.623	-43.49	5.11	-13.0	30.49	96.00	Horizontal	Horizontal	Pass
6996.001	-34.33	22.26	-13.0	21.33	144.10	Horizontal	Horizontal	Pass

GSM 850 Middle Channel, 30MHz -10GHz, RSE-V

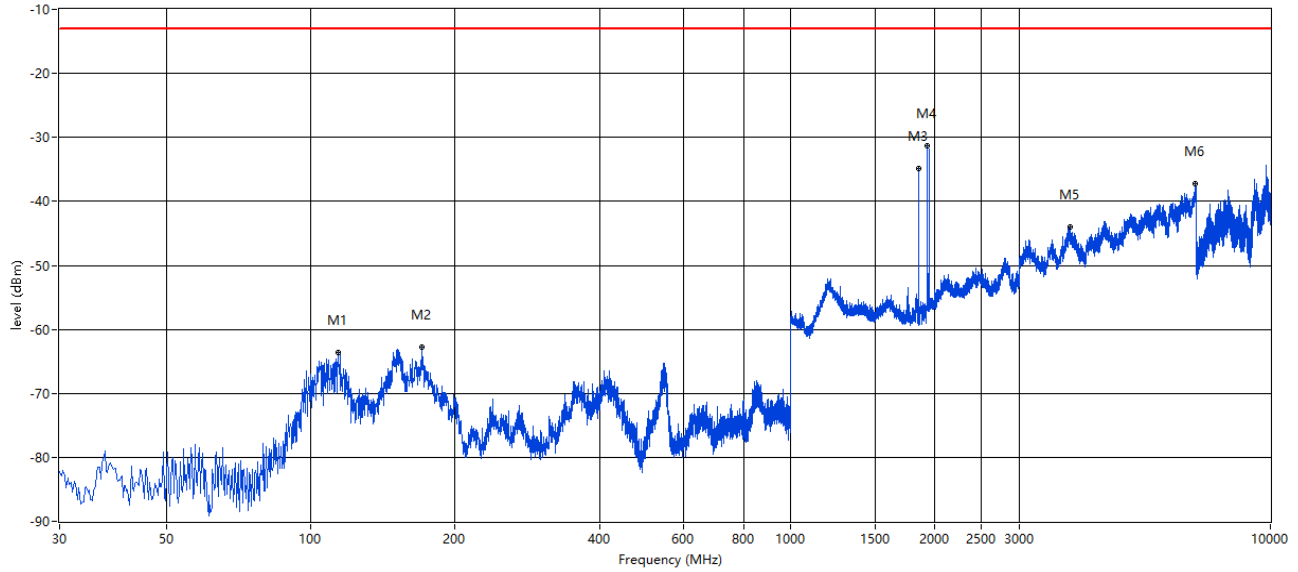
RSE Test case_CE FCC_FCC PART22&24&27_FCC PART 22_850_GSM 850&CDMA BC0&WCDMA B5<E B5&26



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
133.764	-60.11	-17.05	-13.0	47.11	80.20	Vertical	Horizontal	Pass
242.377	-63.71	-5.03	-13.0	50.71	0.20	Vertical	Horizontal	Pass
836.596	-53.76	3.29	-13.0	40.76	13.50	Vertical	Horizontal	N.A
881.871	-37.77	2.11	-13.0	24.77	265.50	Vertical	Horizontal	N.A
1672.832	-42.28	-1.26	-13.0	29.28	86.80	Vertical	Horizontal	Pass
6996.001	-35.02	22.26	-13.0	22.02	8.00	Vertical	Horizontal	Pass

GSM 1900 Low Channel, 30MHz -10GHz, RSE-H

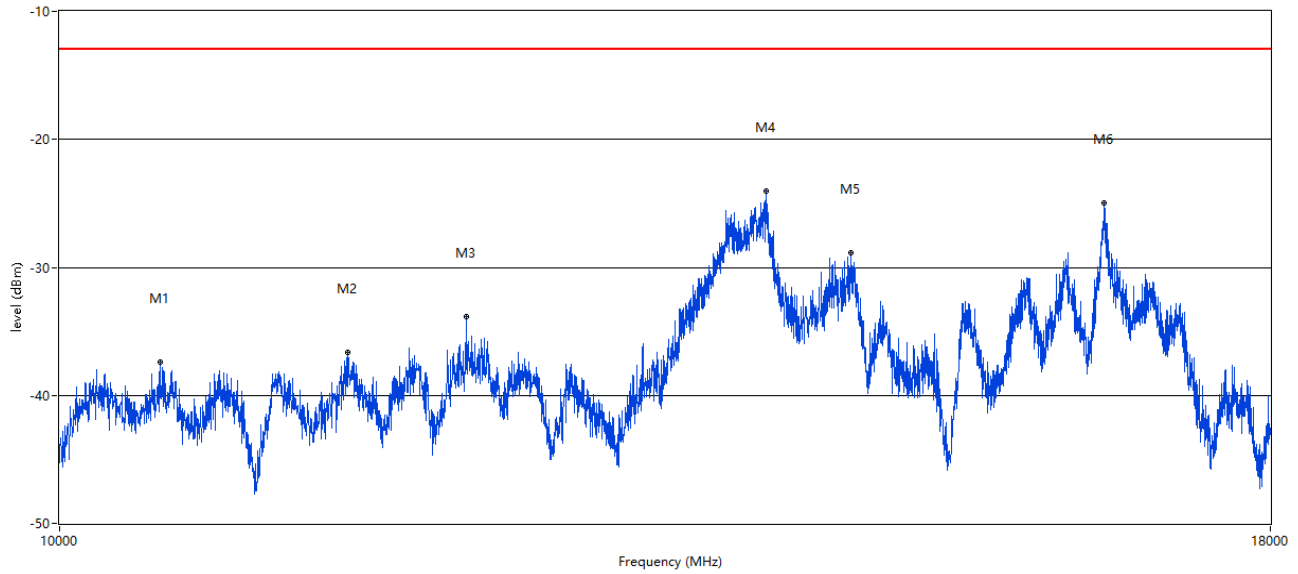
RSE Test case_CCE FCC_FCC PART22&24&27_FCC PART 24_1900_GSM 1900&WCDMA B2&CDMA BC1&LTE B2&25



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
114.126	-63.59	-12.49	-13.0	50.59	182.00	Horizontal	Vertical	Pass
170.615	-62.84	-17.71	-13.0	49.84	11.00	Horizontal	Vertical	Pass
1850.287	-34.81	-0.16	-13.0	21.81	328.00	Horizontal	Vertical	N.A
1929.768	-31.37	0.19	-13.0	18.37	339.00	Horizontal	Vertical	N.A
3830.792	-44.05	11.96	-13.0	31.05	173.00	Horizontal	Vertical	Pass
6964.009	-37.25	21.05	-13.0	24.25	150.00	Horizontal	Vertical	Pass

GSM 1900 Low Channel, 10GHz -18GHz, RSE-H

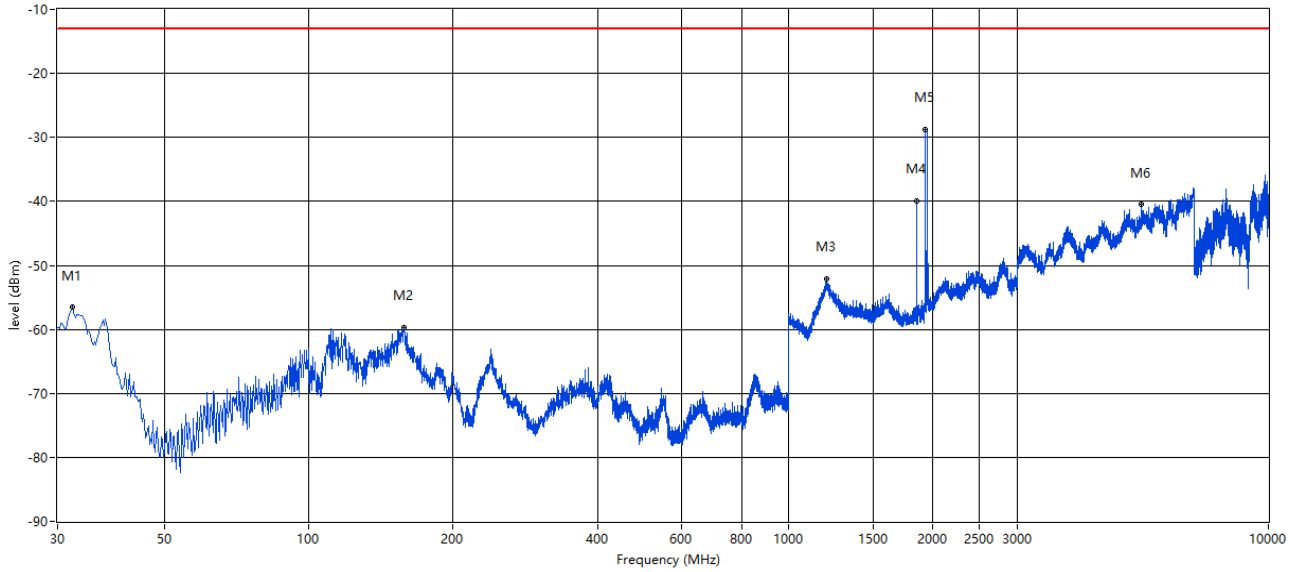
RSE Test case_CE FCC_FCC PART22&24&27_FCC GSM 10-18G



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
10499.875	-37.41	18.92	-13.0	24.41	32.00	Horizontal	Horizontal	Pass
11499.625	-36.66	20.20	-13.0	23.66	126.00	Horizontal	Horizontal	Pass
12183.454	-33.85	20.50	-13.0	20.85	81.00	Horizontal	Horizontal	Pass
14090.977	-24.05	32.75	-13.0	11.05	88.00	Horizontal	Horizontal	Pass
14684.829	-28.88	28.74	-13.0	15.88	52.00	Horizontal	Horizontal	Pass
16606.348	-24.99	30.11	-13.0	11.99	86.00	Horizontal	Horizontal	Pass

GSM 1900 Low Channel, 30MHz-10GHz, RSE-V

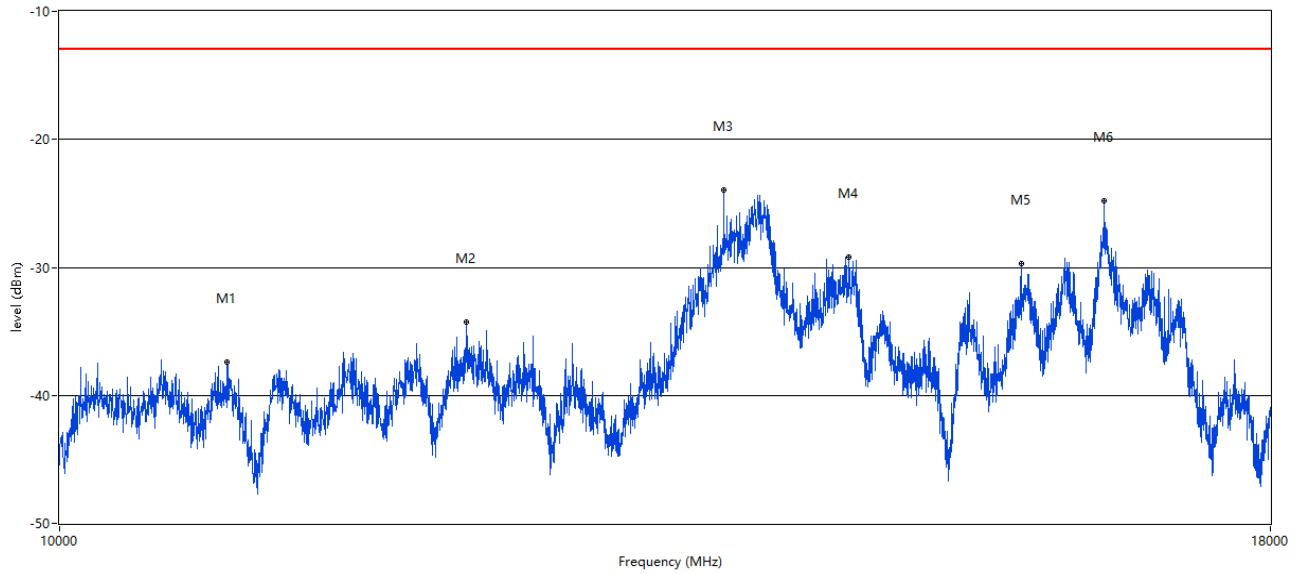
RSE Test case_CE FCC_FCC PART22&24&27_FCC PART 24_1900_GSM 1900&WCDMA B2&CDMA BC1<E B2&25



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
32.182	-56.43	-12.95	-13.0	43.43	310.60	Vertical	Horizontal	Pass
157.766	-59.75	-16.97	-13.0	46.75	274.00	Vertical	Horizontal	Pass
1198.450	-52.18	3.89	-13.0	39.18	295.00	Vertical	Horizontal	Pass
1849.788	-40.00	-0.16	-13.0	27.00	28.00	Vertical	Horizontal	N.A
1929.768	-28.71	0.19	-13.0	15.71	42.00	Vertical	Horizontal	N.A
5441.390	-40.50	15.53	-13.0	27.50	303.00	Vertical	Horizontal	Pass

GSM 1900 Low Channel, 10GHz -18GHz, RSE-V

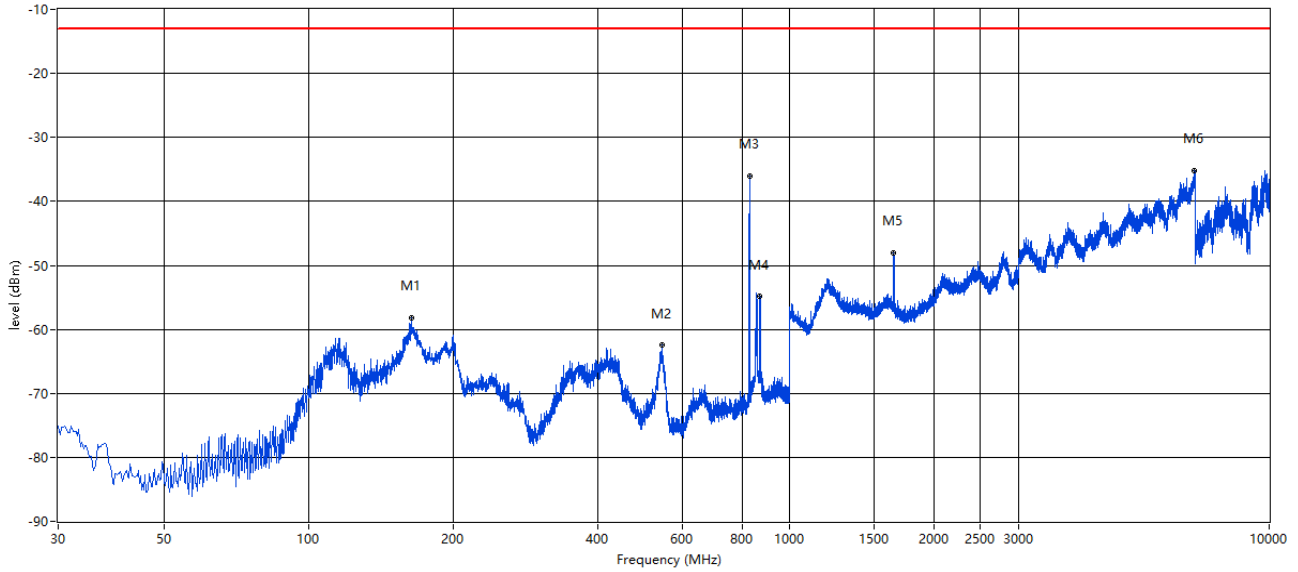
RSE Test case_CE FCC_FCC PART22&24&27_FCC GSM 10-18G



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
10847.788	-37.37	18.57	-13.0	24.37	205.00	Vertical	Horizontal	Pass
12185.454	-34.23	20.52	-13.0	21.23	52.00	Vertical	Horizontal	Pass
13805.049	-23.96	30.25	-13.0	10.96	1.00	Vertical	Horizontal	Pass
14670.832	-29.20	28.56	-13.0	16.20	65.00	Vertical	Horizontal	Pass
15950.512	-29.68	23.75	-13.0	16.68	144.00	Vertical	Horizontal	Pass
16602.349	-24.82	30.27	-13.0	11.82	141.00	Vertical	Horizontal	Pass

WCDMA Band5 Low Channel, 30MHz-10GHz, RSE-H

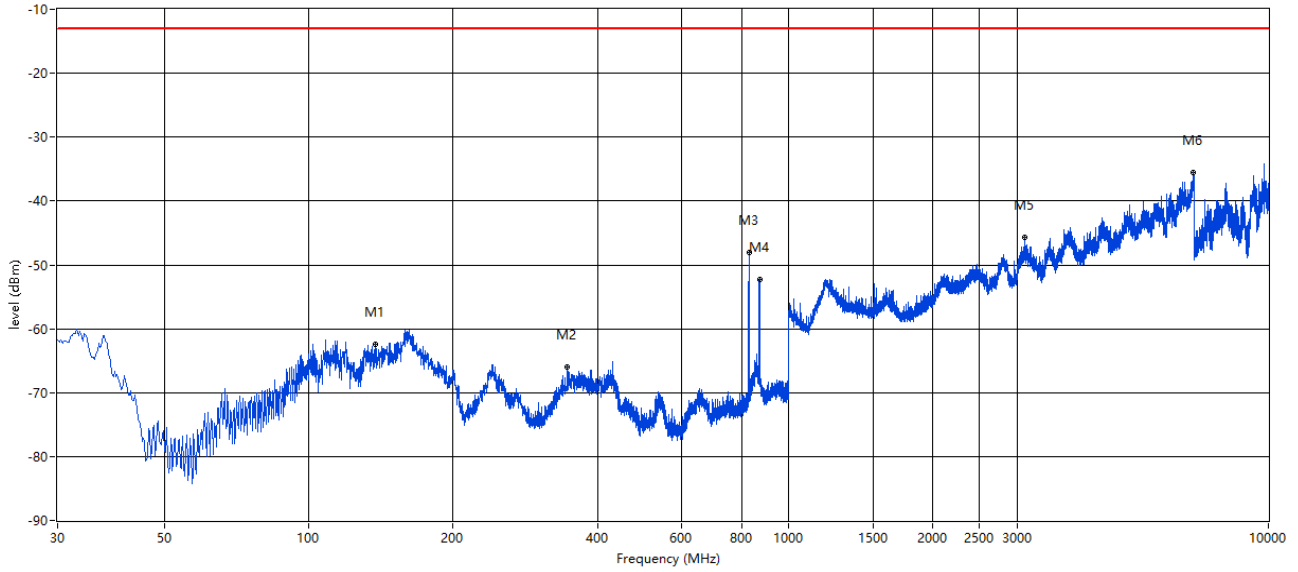
RSE Test case_CE FCC_FCC PART22&24&27_FCC PART 22_850_GSM 850&CDMA BC0&WCDMA B5&LTE B5&26



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
163.099	-58.19	-16.96	-13.0	45.19	144.00	Horizontal	Horizontal	Pass
542.274	-62.36	-5.73	-13.0	49.36	0.90	Horizontal	Horizontal	Pass
826.383	-36.04	1.61	-13.0	23.04	306.00	Horizontal	Horizontal	N.A
871.325	-54.74	3.26	-13.0	41.74	114.30	Horizontal	Horizontal	N.A
1650.837	-47.98	-0.85	-13.0	34.98	54.70	Horizontal	Horizontal	Pass
6990.002	-35.26	21.75	-13.0	22.26	27.40	Horizontal	Horizontal	Pass

WCDMA Band5 Low Channel, 30MHz-10GHz, RSE-V

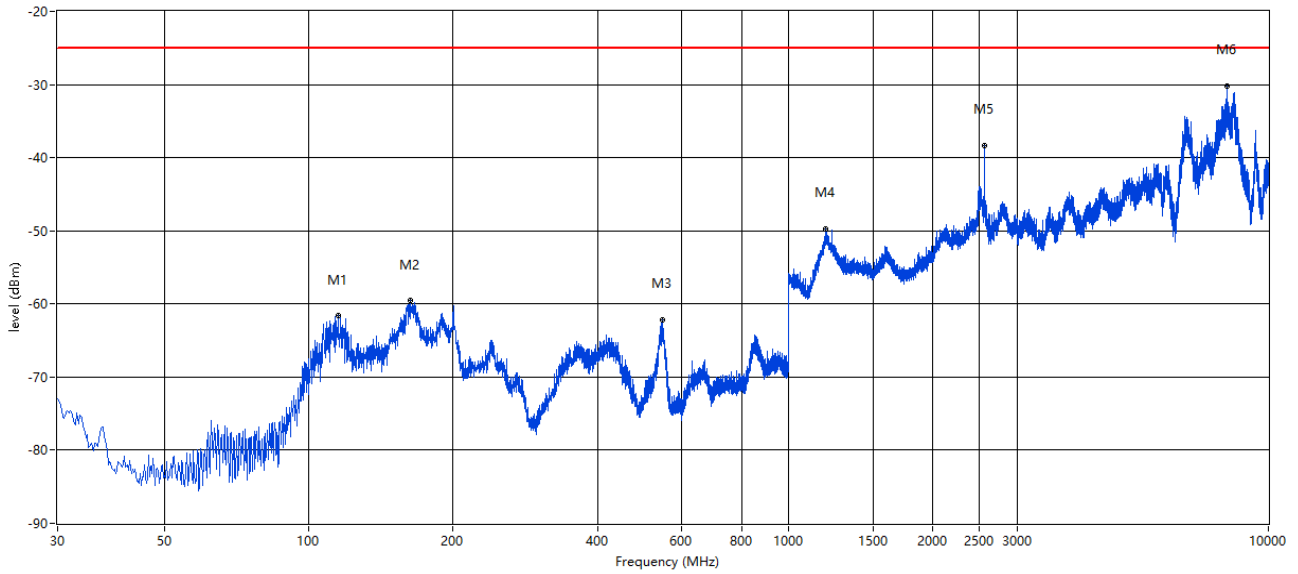
RSE Test case_CE FCC_FCC PART22&24&27_FCC PART 22_850_GSM 850&CDMA BC0&WCDMA B5&LTE B5&26



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
162.129	-60.24	-16.93	-13.0	47.24	71.00	Vertical	Horizontal	Pass
429.540	-65.20	-7.40	-13.0	52.20	265.00	Vertical	Horizontal	Pass
827.383	-48.00	1.61	-13.0	35.00	218.00	Vertical	Horizontal	N.A
870.537	-52.21	3.10	-13.0	39.21	353.00	Vertical	Horizontal	N.A
3103.974	-45.67	10.11	-13.0	32.67	337.00	Vertical	Horizontal	Pass
6971.007	-35.56	21.33	-13.0	22.56	132.00	Vertical	Horizontal	Pass

LTE Band41-5MHz Low Channel, 30MHz-10GHz, RSE-H

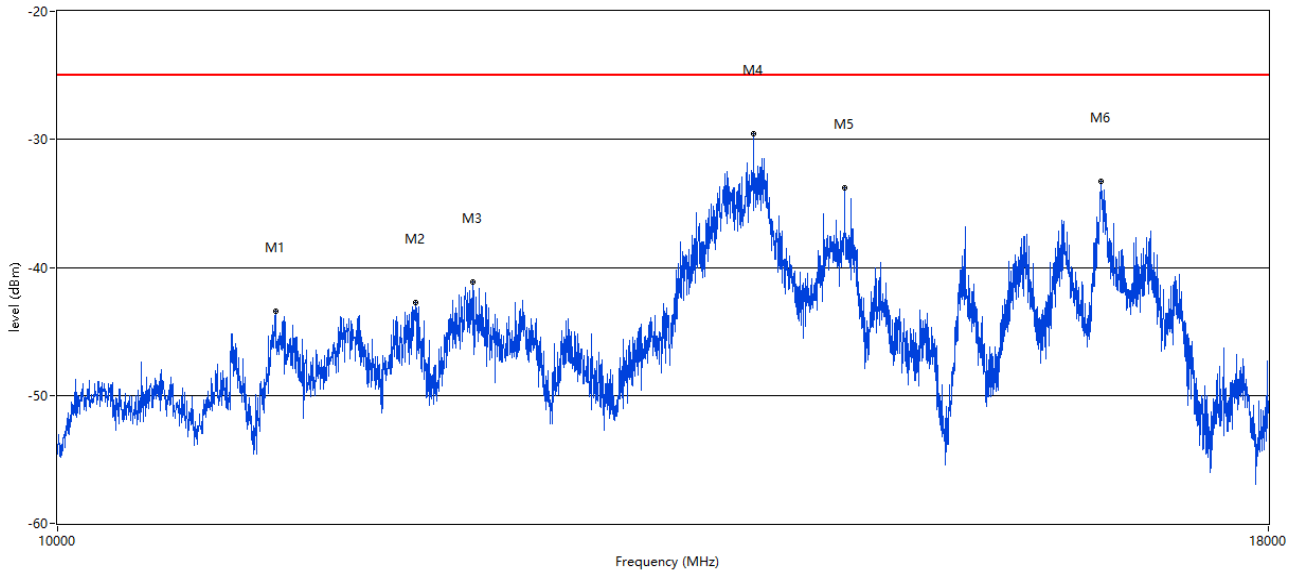
RSE Test case_CE FCC_FCC PART22&24&27_FCC LTE B41



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
115.339	-61.58	-11.85	-25.0	36.58	37.50	Horizontal	Horizontal	Pass
163.342	-59.52	-16.40	-25.0	34.52	176.80	Horizontal	Horizontal	Pass
547.123	-62.20	-4.40	-25.0	37.20	6.10	Horizontal	Horizontal	Pass
1195.451	-49.68	5.63	-25.0	24.68	208.20	Horizontal	Horizontal	Pass
2559.110	-38.39	10.27	-25.0	13.39	116.50	Horizontal	Horizontal	N/A
8184.454	-30.28	27.55	-25.0	5.28	6.00	Horizontal	Horizontal	Pass

LTE Band41-5MHz Low Channel, 10GHz -18GHz, RSE-H

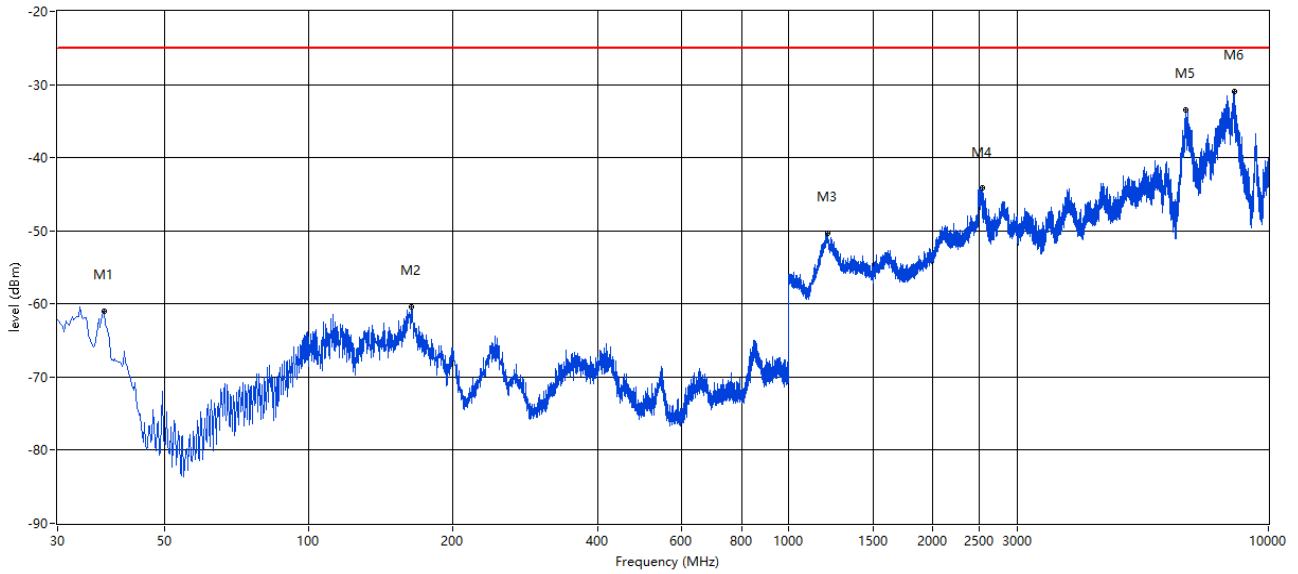
RSE Test case_CE FCC_FCC PART22&24&27_FCC LTE B41 10-18G



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
11117.721	-43.43	19.18	-25.0	18.43	105.00	Horizontal	Horizontal	Pass
11899.525	-42.75	19.95	-25.0	17.75	120.00	Horizontal	Horizontal	Pass
12233.442	-41.13	20.51	-25.0	16.13	253.00	Horizontal	Horizontal	Pass
14018.995	-29.59	32.65	-25.0	4.59	227.00	Horizontal	Horizontal	Pass
14652.837	-33.76	28.34	-25.0	8.76	119.00	Horizontal	Horizontal	Pass
16598.350	-33.26	30.20	-25.0	8.26	284.00	Horizontal	Horizontal	Pass

LTE Band41-5MHz Low Channel, 30MHz-10GHz, RSE-V

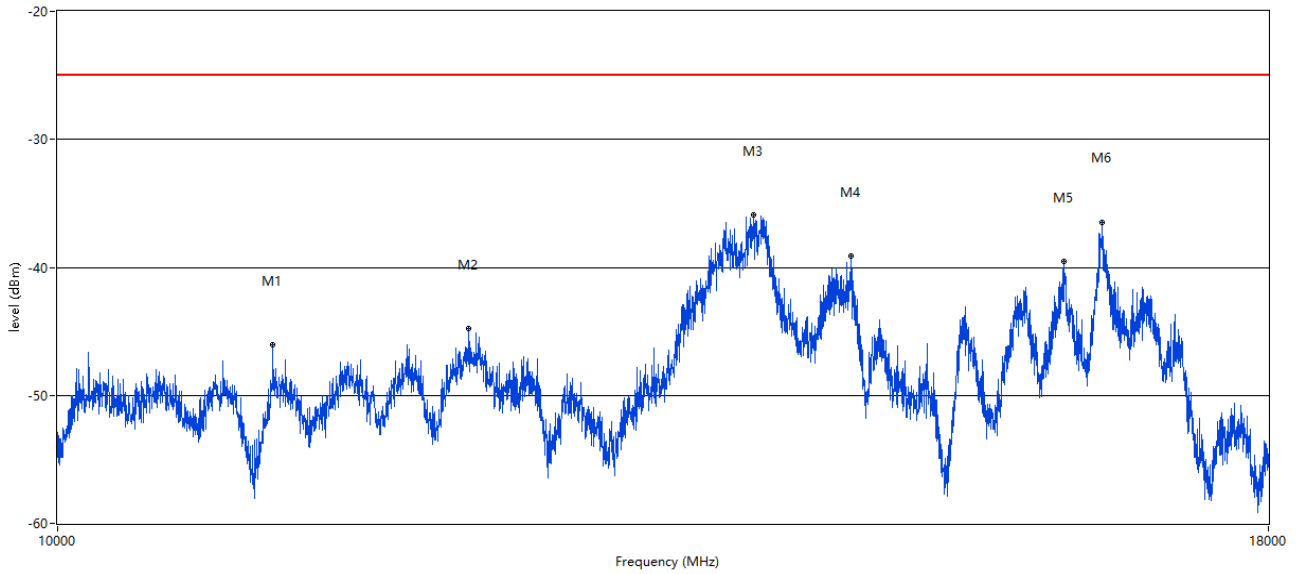
RSE Test case_CE FCC_FCC PART22&24&27_FCC LTE B41



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
37.516	-61.01	-11.66	-25.0	36.01	284.00	Vertical	Horizontal	Pass
164.069	-60.41	-16.39	-25.0	35.41	118.30	Vertical	Horizontal	Pass
1206.948	-50.32	5.62	-25.0	25.32	137.00	Vertical	Horizontal	Pass
2541.615	-44.05	10.97	-25.0	19.05	351.00	Vertical	Horizontal	N/A
6730.817	-33.47	26.09	-25.0	8.47	2.00	Vertical	Horizontal	Pass
8492.377	-30.99	26.72	-25.0	5.99	9.00	Vertical	Horizontal	Pass

LTE Band41-5MHz Low Channel, 10GHz -18GHz, RSE-V

RSE Test case_CE FCC_FCC PART22&24&27_FCC LTE B41 10-18G



Frequency (MHz)	Result (dBm)	Factor (dB)	PK Limit (dBm)	Margin (dB)	Table (o)	ANT	EUT	Verdict
11099.725	-46.05	19.46	-25.0	21.05	206.00	Vertical	Horizontal	Pass
12207.448	-44.80	20.66	-25.0	19.80	164.00	Vertical	Horizontal	Pass
14020.995	-35.90	32.65	-25.0	10.90	132.00	Vertical	Horizontal	Pass
14696.826	-39.11	28.89	-25.0	14.11	68.00	Vertical	Horizontal	Pass
16298.425	-39.51	27.08	-25.0	14.51	334.00	Vertical	Horizontal	Pass
16602.349	-36.46	30.27	-25.0	11.46	4.00	Vertical	Horizontal	Pass

A.8 Receiver Spurious Emissions

Note: Receiver Spurious Emissions test result please refer to original test report No.BL-EC1830166-501 issued by Shenzhen BALUN Technology Co., Ltd. on Apr. 27, 2018 section A.8 Receiver Spurious Emissions.

ANNEX B TEST SETUP PHOTOS

Please refer to the document "BL-EC1850443-AR.PDF".

ANNEX C EUT EXTERNAL PHOTOS

Please refer to the document "BL- EC1850443-AW.PDF".

ANNEX D EUT INTERNAL PHOTOS

Please refer to the document "BL- EC1850443-AI.PDF".

--END OF REPORT--